Applications of the Derivatives to the variations of functions

[use one full page per function to answer. See model on next page].

For each of the following functions :

1. Give the set of definition, D_f, in the form of intervals (open or closed).
2. Calculate the Derivative by using the general formulas.
3. Solve the equation $f'(x) = 0$.
4. Study the sign of the derivative on the intervals of D_f.
5. Chart the sign of $f'(x)$ on D_f and draw the variations of f accordingly.
6. Complete the chart with the limits of the function at every end of D_f.
7. Find the values of maximum and minimum if any (show value in chart).
8. Find the coordinates of the interception with the axes (Ox) and Oy)
9. Find the equation of each asymptote parallel to the axes or oblique.
10. Sketch the curve (C_f) of the function very carefully with its asymptotes.

You may check your answers on a computer or a graphic calculator, but you must draw the curve yourself.

$$f_{13}(x) = \left| \frac{1+x}{1+|x|} \right|$$

$$f_{14}(x) = x + \sqrt{x^2+1}$$

$$f_{15}(x) = \frac{x^2+4x}{\sqrt{|x^2+4x+1|}}$$

$$f_{16}(x) = x\sqrt{\left|\frac{1-x}{1+x}\right|}$$

$f(x) =$

1. *Set of definition :* $D_f =$
2. *Derivative* $f'(x) =$
3. *Zeroes and Sign of the derivative :*
4. *Asymptotes Equations* ***(show calculations proofs on back) :***
5. *Chart :*

x	$-\infty$ $+\infty$
Sign [f '(x)]	
Variations *and* ***limits*** of f	

• *show decimal values of the extremes in the chart.*